DENON

Hi-Fi Stereo Tuner

EUROPEAN MODEL

SERVICE MANUAL

MODEL TU-450/450L

TU450
2-BAND (AM-FM) STEREO TUNER

TU450L
3-BAND (LW-MW-FM) STEREO TUNER

TU-450

TU-450L

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NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

FM SECTION

Frequency Range:	87.50 ~ 108.00 MHz
Antenna:	75 ohm unbalanced/300 ohm balanced
Usable Sensitivity:	1.0 μV (11.2 dBf)
S/N 50 dB Sensitivity:	Stereo: 23 μV (38.5 dBf) Monaural: 3.1 μV (21.2 dBf)
Image Rejection:	70 dB
IF Rejection:	85 dB
Spurious Response Rejection:	80 dB
AM Suppression:	50 dB
Effective Selectivity:	75 dB (±400 kHz)
Capture Ratio:	1.5 dB
Frequency Response:	20 Hz to 15 kHz $^{+0.2}_{-1.5}$ dB
Signal-to-noise Ratio:	Monaural: 80 dB Stereo: 76 dB
Total Harmonic Distortion:	
Monaural	1 kHz 0.3% (at 100% modulation)
Stereo	1 kHz 0.7% (at 90% modulation)
Stereo Separation:	1 kHz 40 dB
Muting Level:	10 μV
Output Level (at 100% modulation):	0.6 V (75 kHz deviation)

AM SECTION

MEDIUM WAVE

Frequency Range:	522 ~ 1611 kHz
Antenna Terminal:	Terminal Type, with Loop Antenna
Usable Sensitivity:	18 μV
Selectivity:	33 dB (9 kHz)
Image Rejection:	35 dB
Signal-to-noise Ratio:	53 dB
Total Harmonic Distortion:	0.6%
Output Level (at 30% modulation):	0.18 V

LONG WAVE (For TU-450L only)

Frequency Range:	153 ~ 360 kHz
Usable Sensitivity:	30 μV
Selectivity:	35 dB (±9 kHz)
Image Rejection:	50 dB
Signal-to-noise Ratio:	50 dB

OTHERS

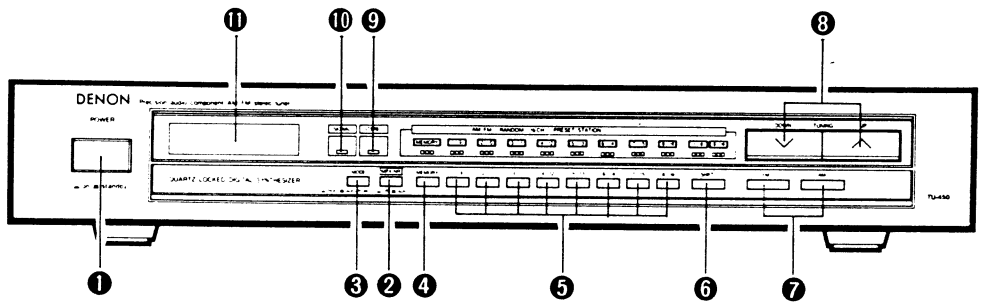
Power Supply:	AC 220 V/50 Hz (for Europe) AC 240 V/50 Hz (for England for EK Version only)
Power Consumption:	AC 7 W
Dimensions:	434 mm (17-3/32") W x 70 mm (2-3/4") H x 238 mm (9-3/8") D
Net Weight:	3.0 kg (6 lbs. 10 oz)

Design and specifications are subject to change without prior notice.

NOTE: The following codes correspond to the appropriate models.
E2 for Europe, EK for U.K.
This Service Manual is prepared based on E2 BLACK Version.

FUNCTIONS OF PANEL CONTROLS

- TU-450



- TU-450L

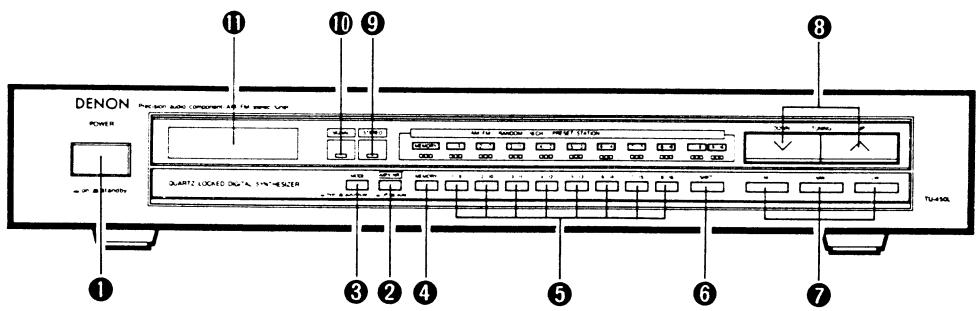


Fig. 1

① POWER (Power On/Standby Switch)
② MPX NR (MPX Noise Reduction Switch)
▙ auto, ▁ off
③ MODE (Mode Switch)
▙ auto/mute, ▁ mono
④ MEMORY (Memory Button)
⑤ PRESET CHANNEL 1 to 8 (Preset Channel Buttons)
⑥ SHIFT (Change Memory)
1–8 ↔ 9–16
⑦ SELECT (Selector Buttons)
FM, AM: TU-450, FM, MW, LW: TU-450L
⑧ TUNING (Tuning Buttons)
∨ down, ∧ up
⑨ STEREO (Stereo Indicator)
⑩ SIGNAL (Signal-Strength Indicators)
⑪ DIGITAL FREQUENCY INDICATOR

CONNECTIONS

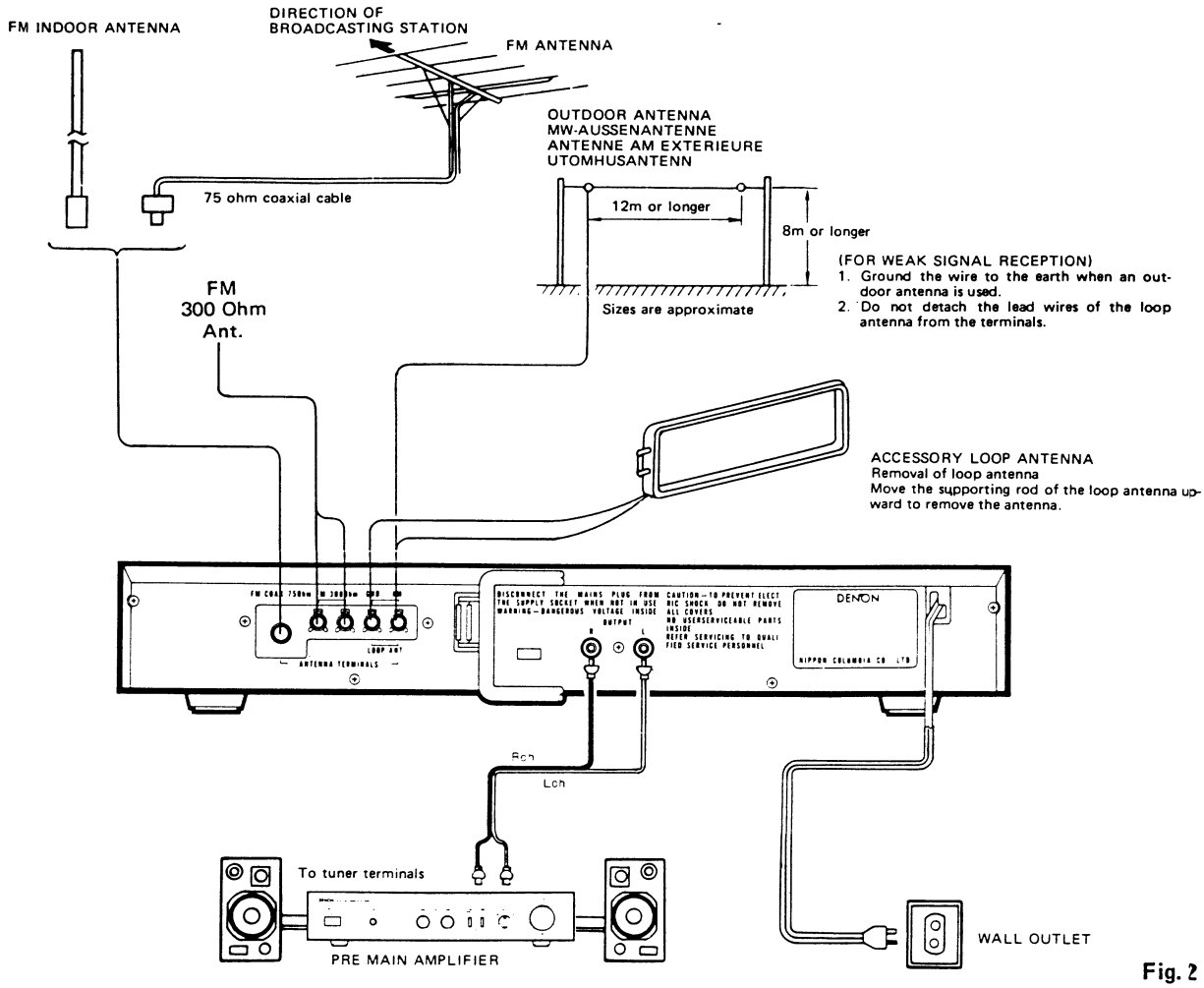


Fig. 2

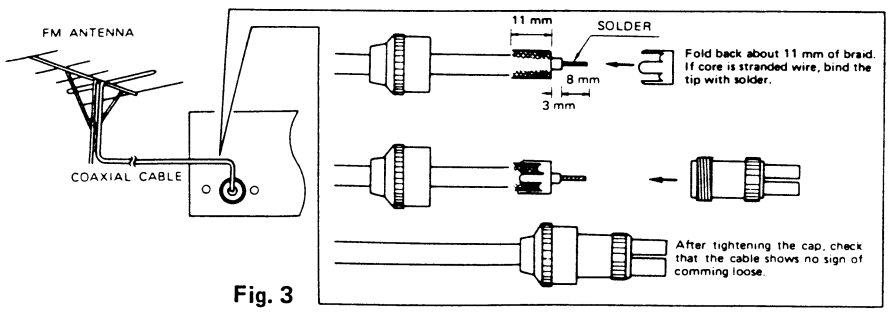

FM ANTENNA
COAXIAL CABLE
11 mm
SOLDER
8 mm
3 mm
Fold back about 11 mm of braid. If core is stranded wire, bind the tip with solder.
After tightening the cap, check that the cable shows no sign of comming loose.

Fig. 3

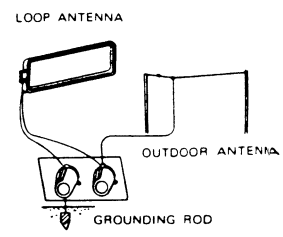


Fig. 4

ANTENNA INSTALLATION

- LEAD WIRE FM INDOOR ANTENNA

  A lead wire indoor antenna can be used in a wood-frame house where broadcasting stations are located nearby and strong signals can be received. While receiving an FM program, extend the antenna. Orient for optimal reception and mount the antenna on the wall or ceiling.

  * In general, FM indoor antenna might not consistently assure stable reception, due to environmental changes. In such case use an FM indoor antenna temporarily until an outdoor antenna is installed.

- FM OUTDOOR ANTENNA CONNECTION (Fig. 3)

  Use 75-ohm coaxial cable or 300 ohm ribbon feeder, to connect the outdoor antenna and the tuner. The 75-ohm coaxial cable (3C–2V, 5C–2V) is preferable to obtain better performance of the tuner.

  * Contact your local dealer for details on selection and installation of the FM outdoor antenna.

  When connecting the coaxial cable to the antenna terminal using the DIN connector, please refer to the procedures in Fig. 3.

- MW and LW ANTENNA CONNECTION (Fig. 4)

  Since this model is provided with a high-performance loop antenna at the back panel, this accessory antenna can effectively be used for optimal reception in places where broadcasting stations are located nearby and relatively strong signals are received with low noise.

  Orient the loop antenna horizontally for obtaining optimal reception.

  In places where strong, clear signals are not received due to the particular location and/or environmental conditions, connect a vinyl lead wire to the MW/LW antenna terminals and hold it to the wall or lintel.

  In places where broadcasting stations are too far away and only weak signals are received, or where signals are blocked by obstacles, install an outdoor antenna for MW/LW.

  * Even if an outdoor antenna is installed, do not detach the loop antenna.

GROUNDING

If there is much noise during reception of a radio program, it is recommended that a grounding wire be used to ground the unit.

Connect a thick vinyl lead wire to the "GND" terminal, and wind the unconnected bare end around a metal water pipe, a grounding rod, or a grounded copper plate.

* Do not connect a grounding wire to a gas pipe in order to prevent explosion of fire.

BLOCK DIAGRAM

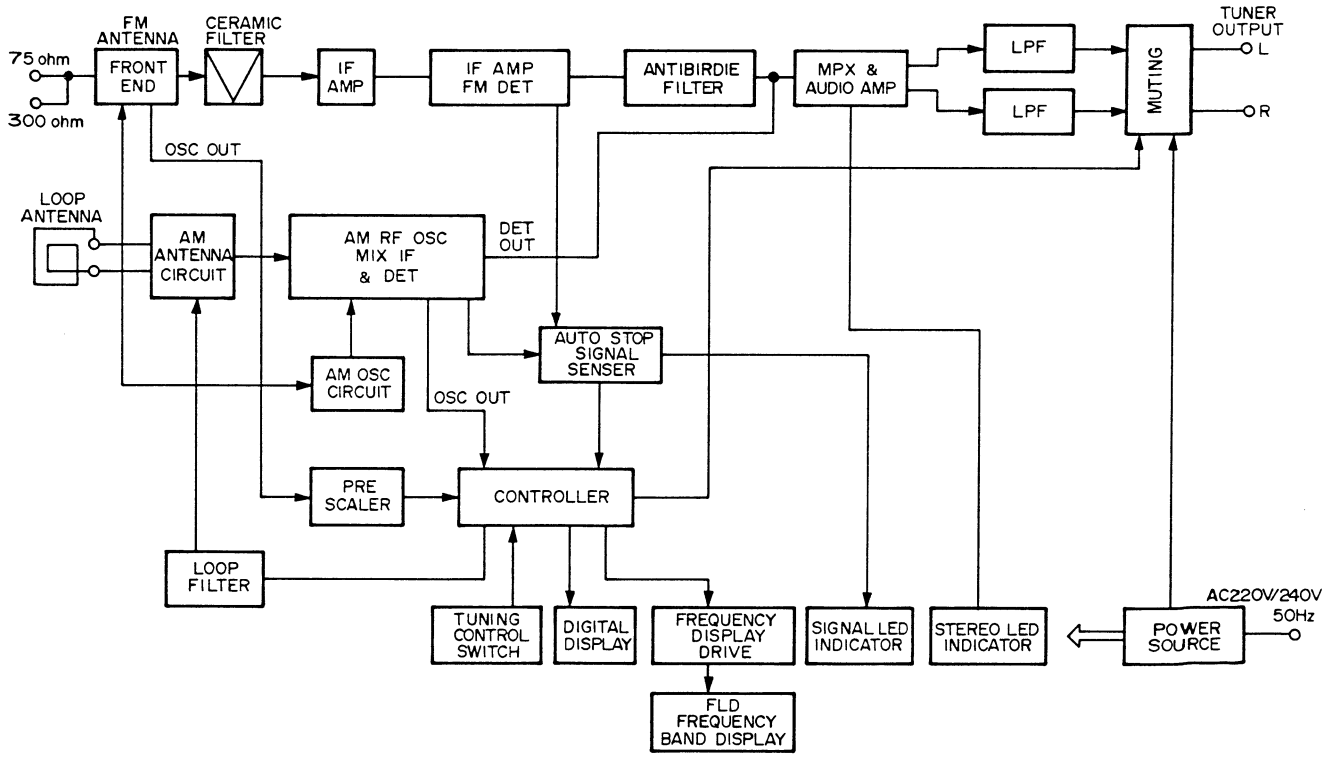


Fig. 5

REMOVE OF EACH SECTION

1. How to remove the top cover (Fig. 6)

(1) Remove the four screws on both sides.
(2) Raise the back of the top cover and remove it.

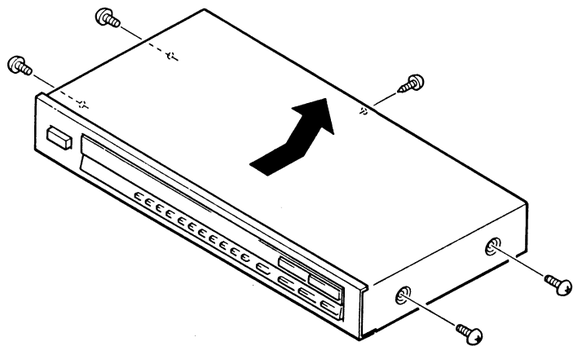


Fig. 6

2. How to remove the Front Panel Ass'y (Fig. 7)

(1) Remove the five screws.
(2) Remove the nail in the center of the Front Panel.
(3) Pull out the F/Panel forwardly.

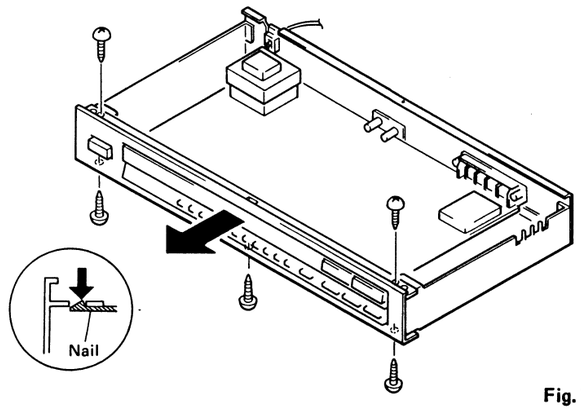


Fig. 7

3. How to remove the Inner Panel (Fig. 8)

(1) Detach the four connectors.
(2) Remove the two screws.

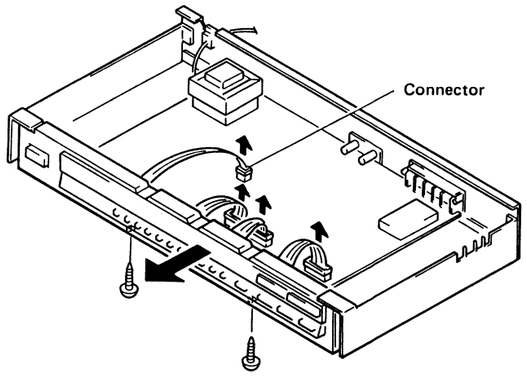


Fig. 8

4. How to remove the Switch Unit P.W.B. (Fig. 9)

A. Switch Ⓐ Unit P.W.B.
(1) Remove the four nails.
B. Switch Ⓑ Unit P.W.B.
(1) Remove the six nails.

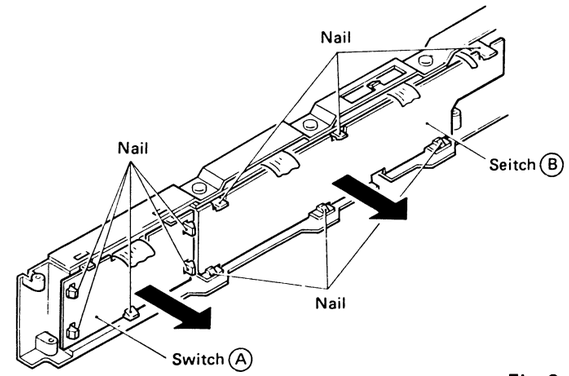


Fig. 9

5. How to remove the Main Unit P.W.B. (Fig. 10)

Tuner Unit P.W.B.
(1) Remove the three screws of the Unit and the two screws for connecting the transformer.
(2) Detach the cord bush of the AC cord.
(3) Remove the three screws of the Back Panel.

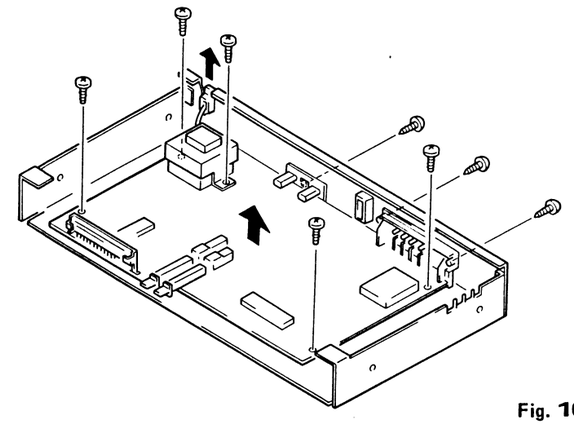


Fig. 10

METHOD OF ADJUSTMENTS

When making adjustments, be sure the power supply is at the rated voltage and the room air is on normal conditions with respect to temperature and humidity.

INSTRUMENT HOOK-UP DIAGRAM

FM

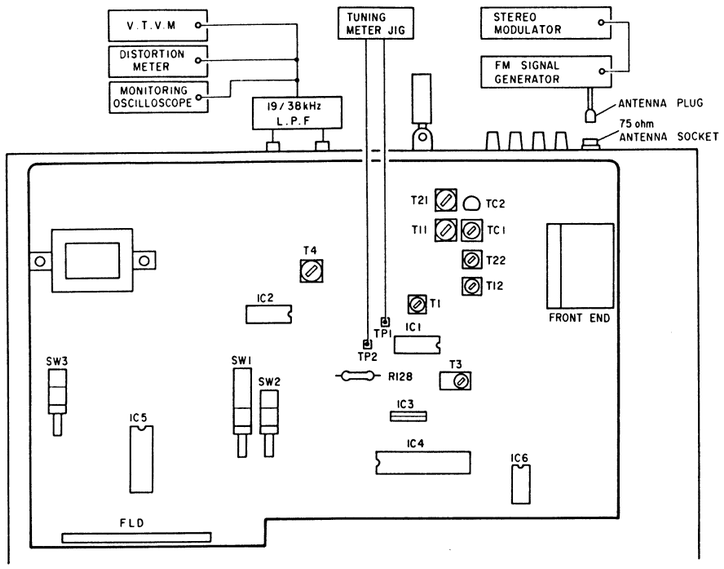


Fig. 11

AM

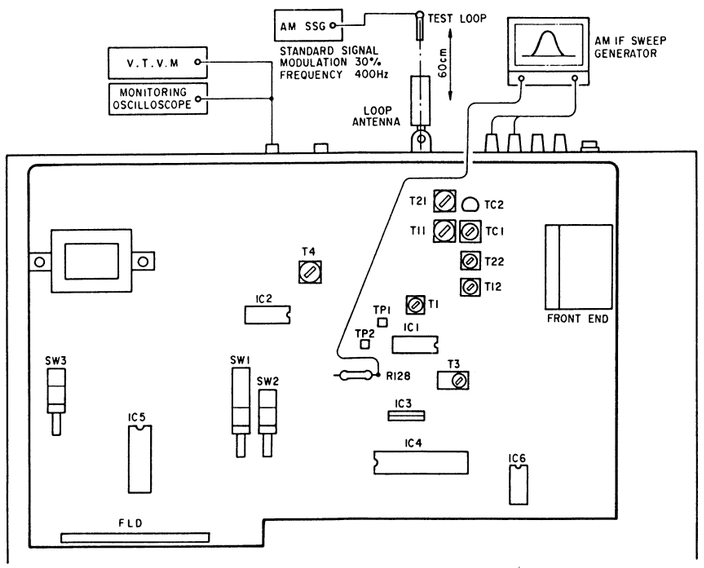


Fig. 12

Tuning Meter Jig

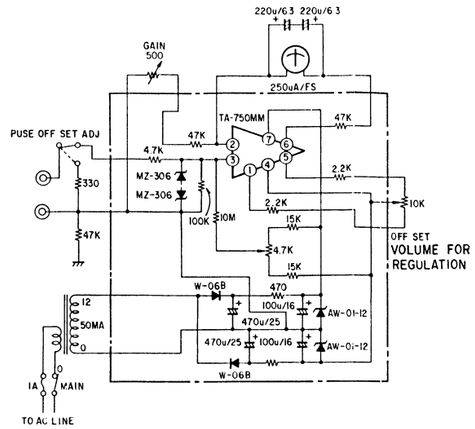


Fig. 13

INSTRUMENT CONNECTIONS AND SETTING

- **Preparation**

1. Connection of Measuring Equipment

FM

(1) The modulated output of the stereo modulator is supplied to an FM signal generator. Connect the output end of the FM signal generator to the antenna terminal (75 ohm) of the unit. Set the stereo modulator to the following conditions:

L + R: 67.5 kHz deviation 1 kHz (internal modulation frequency)
Pilot: 7.5 kHz deviation

(2) Connect a filter jig of 19 kHz to the output terminal L of the unit. Then, connect the output of the filter jig to a distortion meter, the output of which is in turn connected to an oscilloscope for monitoring.

(3) Connect tuning jigs to TP. 1 and 2.

LW or MW

(1) The AM signal generator should be set as follows:
Modulation: 30%, modulation frequency: 400 Hz
(Antenna input signal level: about 60 dB/m).

FM/MPX ALIGNMENT (Fig. 11)

Step	Alignment Item	Tuning Frequency Setting	Input					Output		Adjustment		
			Type	Frequency	Input Level	Modulation	Coupling	Type	Connect to	Points	Adjust to	
1	Tuning Center	98 MHz	FM SSG, Mono	98 MHz	60 dBμ	None	Antenna Terminal	Center Meter	T.P. 1, 2	T-1	Center of Tuning Meter	Function: FM Mode: Auto
2	Distortion (Stereo)	98 MHz	FM SSG Stereo (L)	98 MHz	60 dBμ	Main: 1 kHz L-ch 67.5 kHz Dev. Pilot: 7.5 kHz Dev.	Antenna Terminal	Distortion Meter	Output Terminal (L)	IFT on Front End	Minimum Distortion	Function: FM Mode: Auto
3	Noise Center & Distortion	Repeat 1, 2 to obtain minimum distortion and same time indicating of center meter at center condition.										

LW AND MW ALIGNMENT (Fig. 12)

1	IF	–	IF Sweep	–	Input Level is not over to work A.G.C.	–	Antenna Terminal	Oscilloscope	R128	T-3	Maximum Height and Best Symmetry Curve	Function: MW Center of Wave Form: 450 kHz
2	Tracking Alignment MW	603 kHz	AM SSG	603 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Audio V.T.V.M.	Output Terminal (L)	T-11	Maximum Output	Function: MW
		1404 kHz	AM SSG	1404 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Audio V.T.V.M.	Output Terminal (L)	TC-1	Maximum Output	Function: MW
3	Tracking Alignment LW	163 kHz	AM SSG	163 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Audio V.T.V.M.	Output Terminal (L)	T-21	Maximum Output	Function: LW
		330 kHz	AM SSG	330 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Audio V.T.V.M.	Output Terminal (L)	TC-2	Maximum Output	Function: LW

TUNING UNIT Alignment Points (Component Side)

ETC0852B TUNER UNIT (for 3 Band)

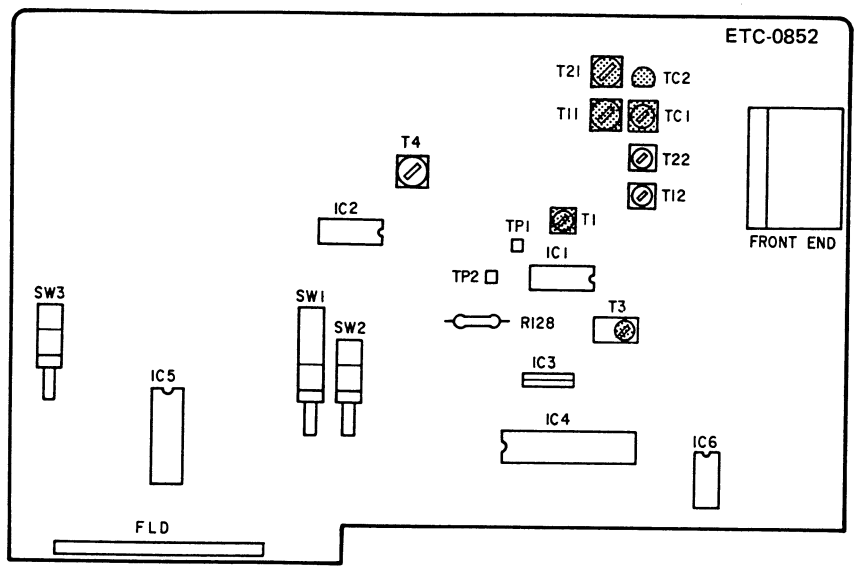


Fig. 14

ETC0861D TUNER UNIT (for 2 Band)

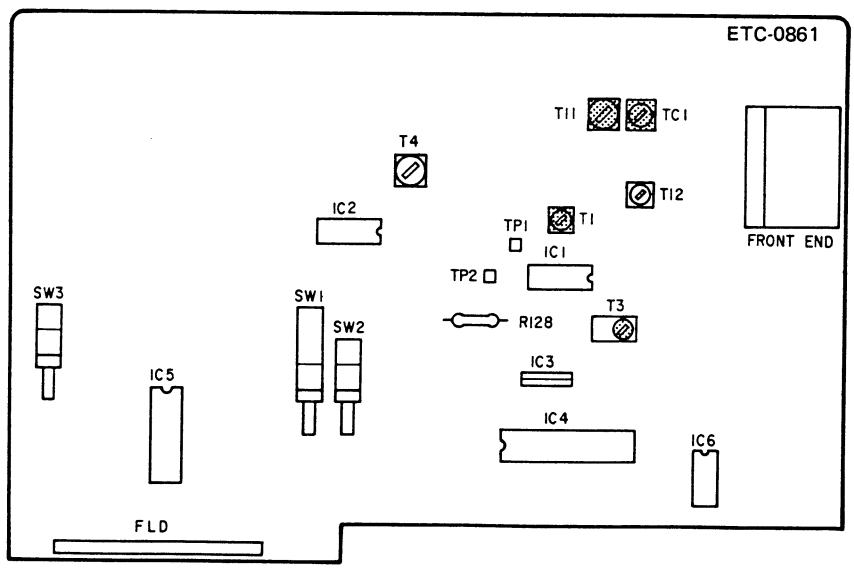
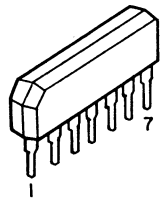


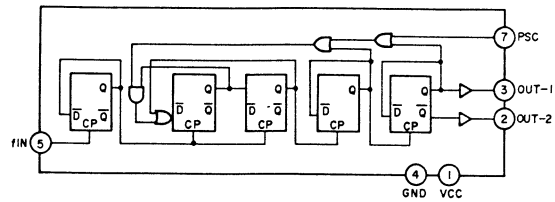
Fig. 15

SEMICONDUCTORS

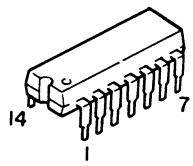
- **IC's**

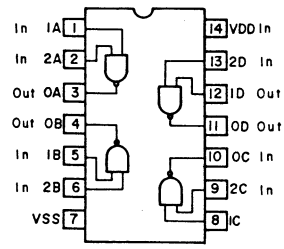
TD6104P (Toshiba)



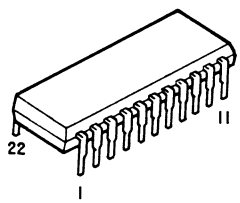


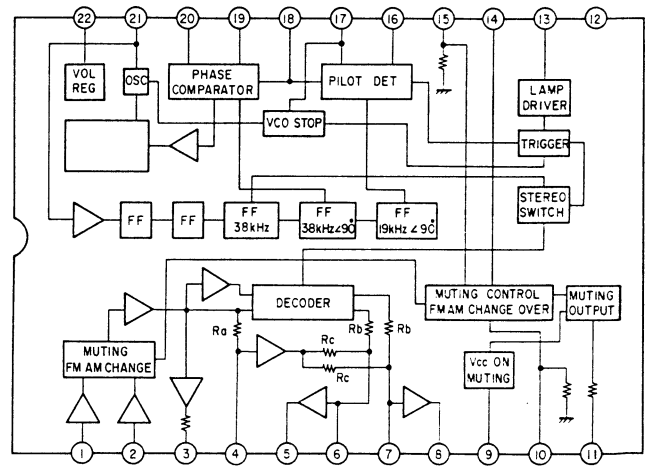
HD14011BP
(Hitachi)



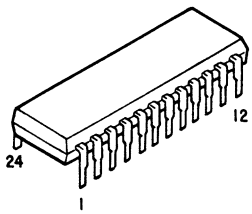


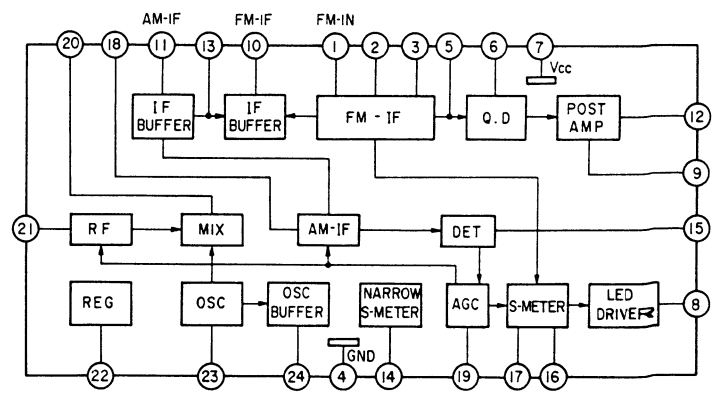
LA3401 (Sanyo)



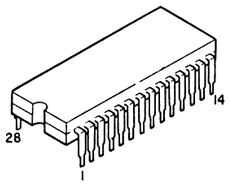


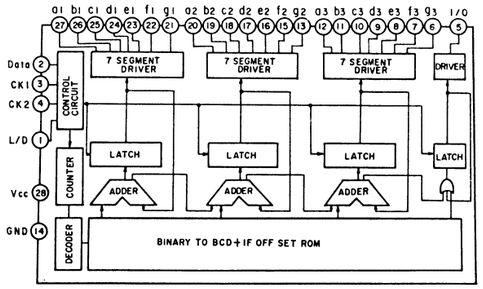
LA1266 (Sanyo)



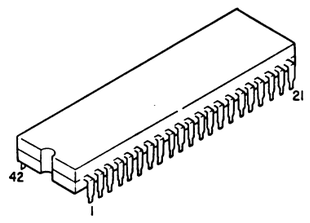


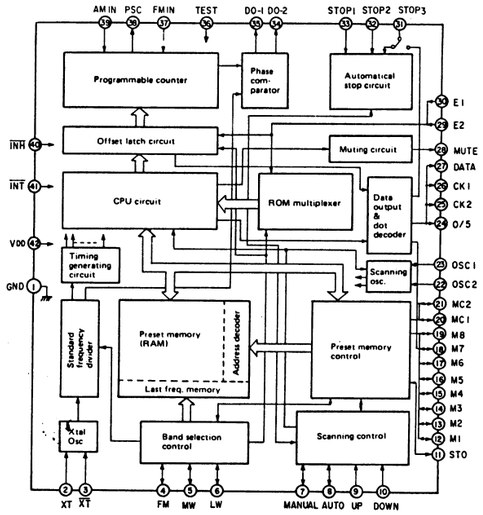
TD6301AP (Toshiba)





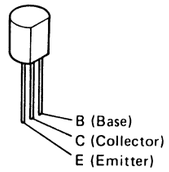
TD9147P (Toshiba)



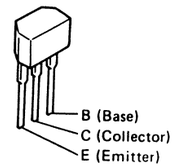


• TRANSISTORS (including FET)

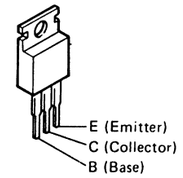
2SC461(C)
2SC1815(BL)



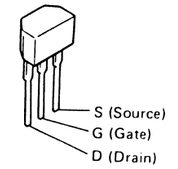
2SA1048(Y/GR)
2SC2458(Y/GR)



2SD880(Y)

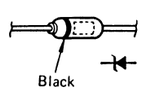


(FET)
2SK365(BL/GR)

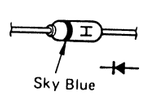


• DIODES, LEDS

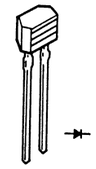
HZ7A-1
HZ12C-2



1S2076

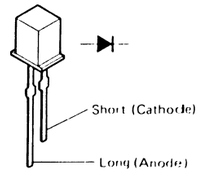


SVC321SP-D2

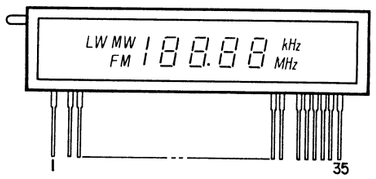


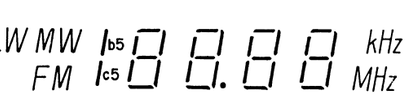
PB103M

(LED)
LT9233 (Green)
LT9213R (Red)



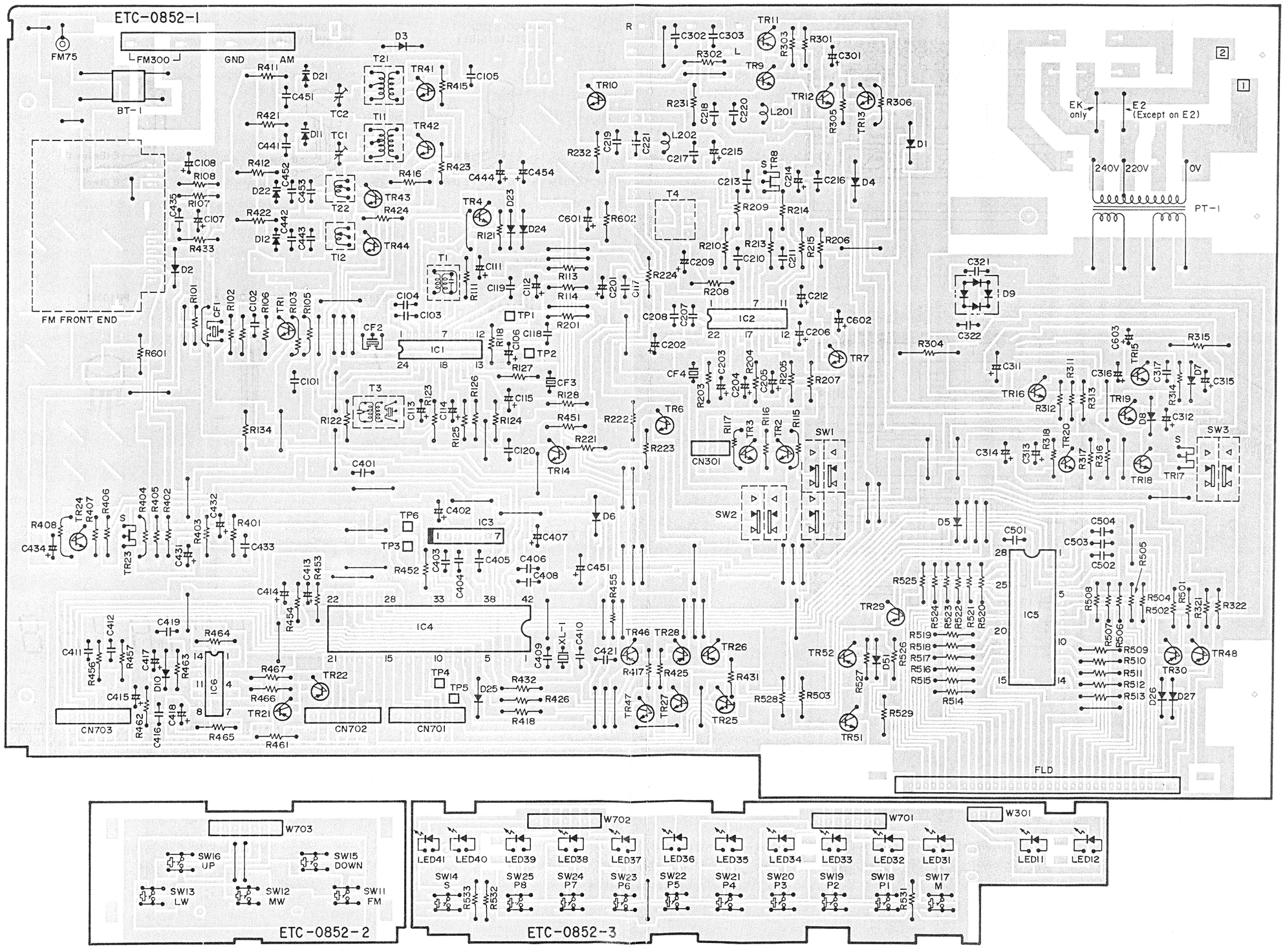
7BT168A (Futaba)



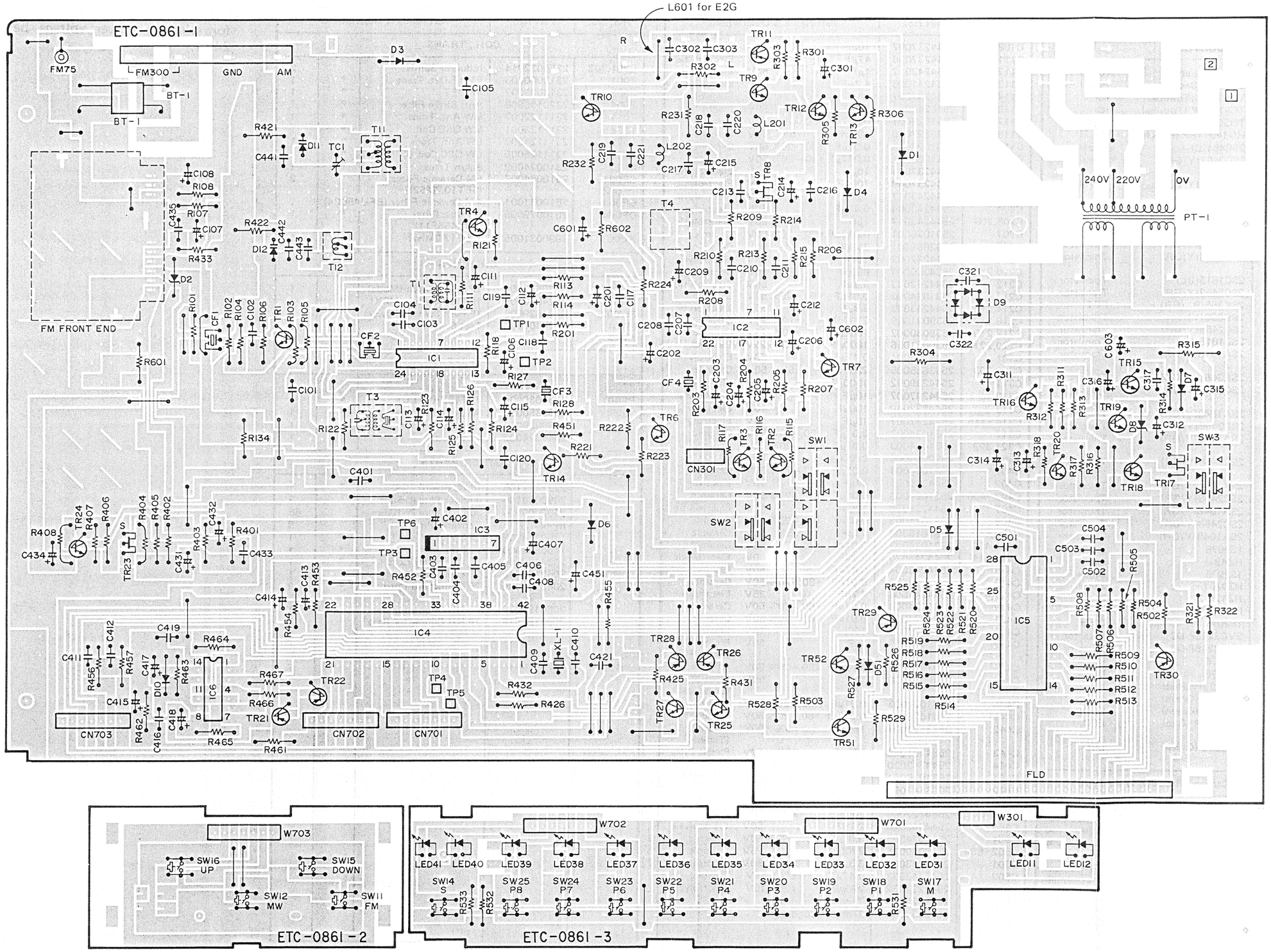


PIN NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
ELECTRODE	F	NP	LW	MW	KHz	G	FM MHz D.P	b5 c5	g4	f4	e4	d4	c4	b4	a4	g3	f3	G	e3	d3	c3	b3	a3	g2	f2	e2	d2	c2	NP	b2	a2	a1 c1 d1	b1 e1	g1	F

ETC0852B TUNER UNIT (for 3 Band)



ETC0861D TUNER UNiT (for 2 Band)



ETC0852B TUNER UNIT PARTS LIST (for 3 Band)

Ref. No.	Part No.	Part Name & Descriptions		
SEMICONDUCTORS				
IC001	2630438008	LA1266 (Sanyo)	IC	•
IC002	2630439007	LA3401 (Sanyo)	IC	•
IC003	2630232000	TD6104P (Toshiba)	IC	
IC004	2620452104	TC9147BP (Toshiba)	IC	
IC005	2620453006	TD6301AP (Toshiba)	IC	
IC006	2620300007	HD14011BP (Hitachi)	IC	
TR001	2730025023	2SC461(C)	Transistor	
TR002 ~004	2730322001	2SC2458(Y/GR)	Transistor	
TR006, 007	2730322001	2SC2458(Y/GR)	Transistor	
TR008	2750053004	2SK365(BL/GR)	FET	
TR009, 010	2730322001	2SC2458(Y/GR)	Transistor	
TR011	2710194000	2SA1048(Y/GR)	Transistor	
TR012 ~014	2730322001	2SC2458(Y/GR)	Transistor	
TR015	2730198015	2SC1815(BL)	Transistor	
TR016	2730322001	2SC2458(Y/GR)	Transistor	
TR017	2750053004	2SK365(BL/GR)	FET	
TR018	2740065002	2SD880(Y)	Transistor	
TR019	2730322001	2SC2458(Y/GR)	Transistor	
TR020	2730198015	2SC1815(BL)	Transistor	
TR021, 022	2710194000	2SA1048(Y/GR)	Transistor	
TR023	2750053004	2SK365(BL/GR)	FET	
TR024, 025	2730322001	2SC2458(Y/GR)	Transistor	
TR026	2710194000	2SA1048(Y/GR)	Transistor	
TR027	2730322001	2SC2458(Y/GR)	Transistor	
TR028 ~030	2710194000	2SA1048(Y/GR)	Transistor	
TR041 ~044	2730322001	2SC2458(Y/GR)	Transistor	
TR046	2710194000	2SA1048(Y/GR)	Transistor	
TR047	2730322001	2SC2458(Y/GR)	Transistor	
TR048	2710194000	2SA1048(Y/GR)	Transistor	
TR051	2730322001	2SC2458(Y/GR)	Transistor	
TR052	2710194000	2SA1048(Y/GR)	Transistor	
D001	2760049008	1S2076	Diode	
D002	2760185014	HZ4B-3	Zener	
D003~006	2760049008	1S2076	Diode	
D007	2760051054	HZ7A-1	Zener	
D008	2760255038	HZ12C-2	Zener	
D009	2760446009	PB103M		
D010	2760049008	1S2076	Diode	
D011,012	2760302004	SVC321SP-D2	Varactor	
D021,022	2760302004	SVC321SP-D2	Varactor	
D023~027	2760049008	1S2076	Diode	
D051	2760049008	1S2076	Diode	
LE011	3939173005	LT9213R (Red)	LED	
LE012	3939356000	LT9233 (Green)	LED	
LE031	3939356000	LT9233 (Green)	LED	
LE032 ~039	3939173005	LT9213R (Red)	LED	
LE040, 041	3939356000	LT9233 (Green)	LED	
RESISTORS (not included Carbon Film ±5%, 1/4W Type)				
R304	2410193000	2.2k ohm ±5% 1/2W	Carbon Film	
⚠ R315	2440033020	220 ohm ±5% 1W	Metal Oxide (NBF)	
CAPACITORS				
⚠ C001	2538014003	0.01μF ±20% 400V(AC)	Ceramic	
C101	2531024003	0.01μF +80,–20% 50V	Ceramic	
C102~104	2531026001	0.047μF +80,–20% 50V	Ceramic	
C105	2531024003	0.01μF +80,–20% 50V	Ceramic	
C106,107	2544237036	47μF 16V	Electrolytic	

Ref. No.	Part No.	Part Name & Descriptions		
C108	2544237007	10μF 16V	Electrolytic	
C111	2544237036	47μF 16V	Electrolytic	
C112	2544243017	1μF 50V	Electrolytic	
C113	2544241006	4.7μF 35V	Electrolytic	
C114	2544237007	10μF 16V	Electrolytic	
C115	2544243033	3.3μF 50V	Electrolytic	
C117	2531026001	0.047μF +80,–20% 50V	Ceramic	
C118	2533627000	100pF ±5% 50V	Ceramic	
C119	2531024003	0.01μF +80,–20% 50V	Ceramic	
C120	2531026001	0.047μF +80,–20% 50V	Ceramic	
C201	2544237001	10μF 16V	Electrolytic	
C202	2544237049	100μF 16V	Electrolytic	
C203	2544243017	1μF 50V	Electrolytic	
C204	2544243004	0.47μF 50V	Electrolytic	
C205,206	2544243017	1μF 50V	Electrolytic	
C207	2531026001	0.047μF +80,–20% 50V	Ceramic	
C208	2533639001	330pF ±5% 50V	Ceramic	
C209	2544237007	10μF 16V	Electrolytic	
C210,211	2534350004	680pF ±5% 50V	Ceramic	
C212	2544243033	3.3μF 50V	Electrolytic	
C213	2531024003	0.01μF +80,–20% 50V	Ceramic	
C214,215	2544243033	3.3μF 50V	Electrolytic	
C216,217	2539031069	2700pF ±10% 25V	Ceramic	
C218,219	2539030002	1000pF ±10% 25V	Ceramic	
C220,221	2539031056	1800pF ±10% 25V	Ceramic	
C301	2544243004	0.47μF 50V	Electrolytic	
C302,303	2533635005	220pF ±5% 50V	Ceramic	
C311	2544239092	1000μF 25V	Electrolytic	
C312	2544237007	10μF 16V	Electrolytic	
C313	2544237049	100μF 16V	Electrolytic	
C314~316	2544237007	10μF 16V	Electrolytic	
C317	2531024003	0.01μF +80,–20% 50V	Ceramic	
C321,322	2531024003	0.01μF +80,–20% 50V	Ceramic	
C351	2590004006	22000μF	Backup Capacitor	
C401	2531024003	0.01μF +80,–20% 50V	Ceramic	
C402	2544235025	47μF 10V	Electrolytic	
C403~406	2531024003	0.01μF +80,–20% 50V	Ceramic	
C407	2544235038	100μF 10V	Electrolytic	
C408	2531024003	0.01μF +80,–20% 50V	Ceramic	
C409,410	2533618006	43pF ±5% 50V	Ceramic	
C411,412	2531024003	0.01μF +80,–20% 50V	Ceramic	
C413,414	2544243020	2.2μF 50V	Electrolytic	
C415	2544243004	0.47μF 50V	Electrolytic	
C416	2531024003	0.01μF +80,–20% 50V	Ceramic	
C417,418	2544241006	4.7μF 35V	Electrolytic	
C419	2531024003	0.01μF +80,–20% 50V	Ceramic	
C421	2531024003	0.01μF +80,–20% 50V	Ceramic	
C431	2544237049	100μF 16V	Electrolytic	
C432	2543016009	1μF 50V	Electrolytic (By Pole)	
C433	2531025002	0.022μF +80,–20% 50V	Ceramic	
C434	2549011008	1μF 50V	Electrolytic (Low Leak)	
C435	2531024003	0.01μF +80,–20% 50V	Ceramic	
C441	2531026001	0.047μF +80,–20% 50V	Ceramic	
C442	2533125007	15pF ±5% 50V	Ceramic (Temp.)	
C443	2554201049	390pF ±5% 50V	Plastic Film	
C444	2544243020	2.2μF 50V	Electrolytic	
C451	2531026001	0.047μF +80,–20% 50V	Ceramic	
C452	2533143005	82pF ±5% 50V	Ceramic (Temp.)	
C453	2554127000	180pF ±5% 50V	Plastic Film	
C454	2544243020	2.2μF 50V	Electrolytic	
C501	2531024003	0.01μF +80,–20% 50V	Ceramic	
C502~504	2539030028	2200pF ±10% 25V	Ceramic	
C601	2544243033	3.3μF ±20% 50V	Electrolytic	
C602	2544243033	0.47μF ±20% 50V	Electrolytic	
C603	2544237052	220μF ±20% 16V	Electrolytic	
TC001	2130022008	Trimmer Condenser		1
TC002	2130037006	Trimmer Condenser		1

Ref. No.	Part No.	Part Name & Descriptions		
COIL, TRANS				
L201,202	2350032014	Inductor 39mH		2
T001	2312060008	FM IF Det. Trans	•	1
T003	2313028007	AM IFT	•	1
T004	2320106006	Anti Birdie Filter	•	1
T011	2311122002	MW Ant. Trans	•	1
T012	2311123001	MW OSC Coil	•	1
T021	2311124000	LW Ant. Trans	•	1
T022	2311125009	LW OSC Coil	•	1
BT1	2310074009	Balun Trans	•	1
CF001, 002	2610064007	FM Ceramic Filter (SFT10.7MS2)		2
CF003	2610031001	AM Ceramic Filter (BFU450C4)		1
CF004	2610079005	Ceramic Filter (CSB456F11)	•	1
XL001	3990031005	X-tal (7.2MHz)		1
SWITCHES				
SW001	2129543006	1P Push Switch (Mode)		1
SW002	2124630008	1P Push Switch (MPX)	•	1
SW003	2124629006	1P Push Switch (Power)	•	
SW011 ~025	2124407008	Tact Switch		15
E.U.P				
⚠ PT001	2335565001	Power Trans	•	1
FL001	3934030004	7BT16ZA (FLD)	•	1
	2050350009	Antenna Terminal	•	1
	2160039003	Front End		1
	2048224008	2P Pin Jack		1
OTHER PARTS				
	2221371105	(P.W. Board)	•	1
	2090008146	Jumper Wire P=5mm		3
	2090008120	Jumper Wire P=10mm		66
	EP-5667H1	Terminal Pin		8
	1460858008	LED Holder	•	1
	1460857009	FLD Holder	•	1
CN301	2034362000	3P Connector Cord	•	1
CN701	2042197018	7P Connector Cord		1
CN702, 703	2042197005	7P Connecrod Cord	•	2
	2050190036	3P NH Connector Base		1
	2050190078	7P NH Connector Base		3

• indicates the parts newly used in this unit.

ETC0852 TUNER UNIT PARTS LIST for U.K (J220 or J240) means only difference of jumper for selecting power voltage between 220V and 240V.

ETC0861D TUNER UNIT PARTS LIST (for 2 Band)

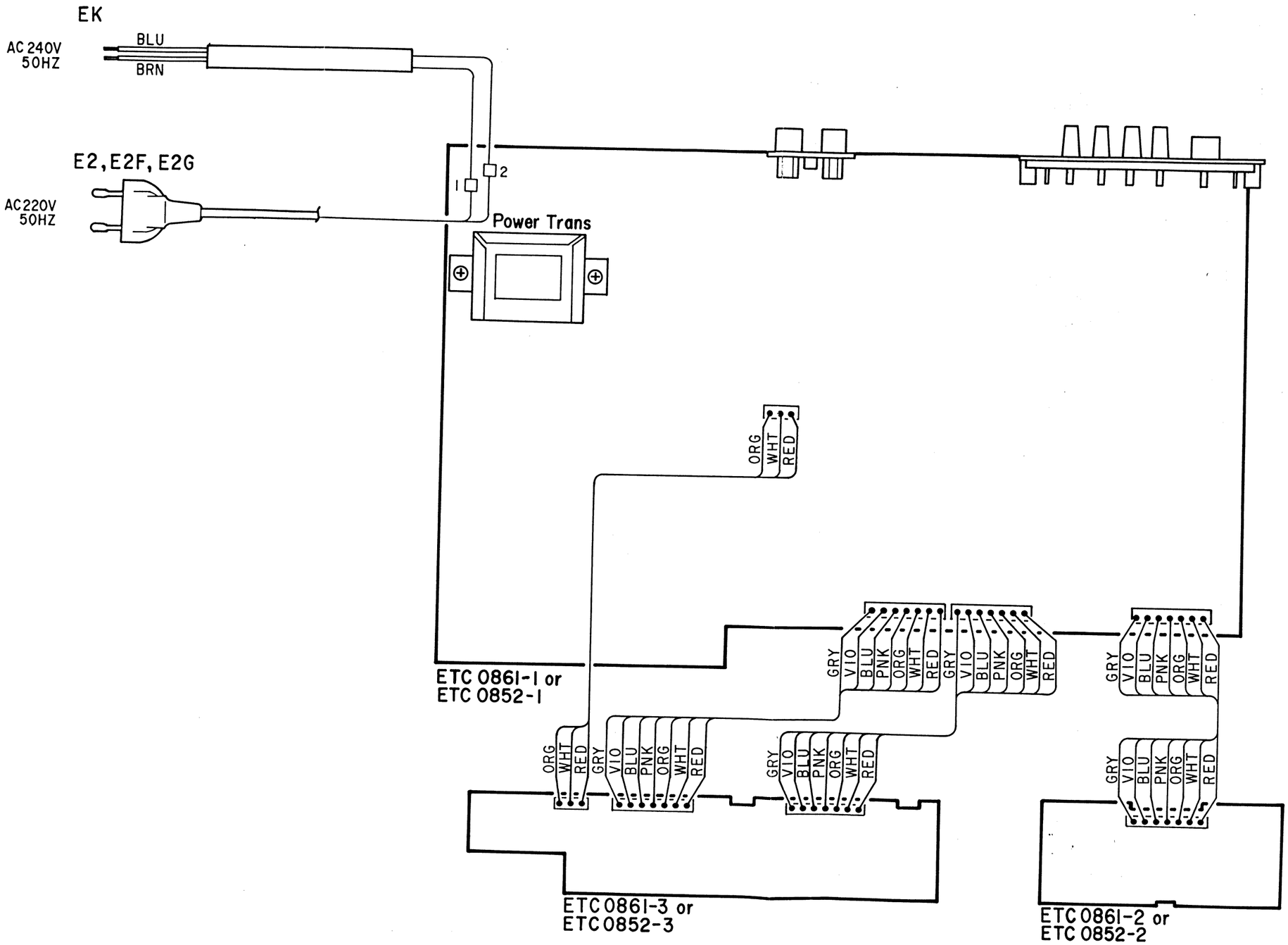
Ref. No.	Part No.	Part Name & Descriptions		
SEMICONDUCTORS				
IC001	2630438008	LA1266 (Sanyo)	IC	•
IC002	2630439007	LA3401 (Sanyo)	IC	•
IC003	2630232000	TD6104P (Toshiba)	IC	
IC004	2620452104	TC9147BP (Toshiba)	IC	
IC005	2620453006	TD6301AP (Toshiba)	IC	
IC006	2620300007	HD14011BP (Hitachi)	IC	
TR001	2730025023	2SC461(C)	Transistor	
TR002 ~004	2730322001	2SC2458(Y/GR)	Transistor	
TR006, 007	2730322001	2SC2458(Y/GR)	Transistor	
TR008	2750053004	2SK365(BL/GR)	FET	
TR009, 010	2730322001	2SC2458(Y/GR)	Transistor	
TR011	2710194000	2SA1048(Y/GR)	Transistor	
TR012 ~014	2730322001	2SC2458(Y/GR)	Transistor	
TR015	2730198015	2SC1815(BL)	Transistor	
TR016	2730322001	2SC2458(Y/GR)	Transistor	
TR017	2750053004	2SK365(BL/GR)	FET	
TR018	2740065002	2SD880(Y)	Transistor	
TR019	2730322001	2SC2458(Y/GR)	Transistor	
TR020	2730198015	2SC1815(BL)	Transistor	
TR021, 022	2710194000	2SA1048(Y/GR)	Transistor	
TR023	2750053004	2SK365(BL/GR)	FET	
TR024, 025	2730322001	2SC2458(Y/GR)	Transistor	
TR026	2710194000	2SA1048(Y/GR)	Transistor	
TR027	2730322001	2SC2458(Y/GR)	Transistor	
TR028 ~030	2710194000	2SA1048(Y/GR)	Transistor	
TR051	2730322001	2SC2458(Y/GR)	Transistor	
TR052	2710194000	2SA1048(Y/GR)	Transistor	
D001	2760049008	1S2076	Diode	
D002	2760185014	HZ4B-3	Zener	
D003~006	2760049008	1S2076	Diode	
D007	2760051054	HZ7A-1	Zener	
D008	2760255038	HZ12C-2	Zener	
D009	2760446009	PB103M		
D010	2760049008	1S2076	Diode	
D011,012	2760302004	SVC321SP-D2	Varactor	
D051	2760049008	1S2076	Diode	
LE011	3939173005	LT9213R (Red)	LED	
LE012	3939356000	LT9233 (Green)	LED	
LE031	3939356000	LT9233 (Green)	LED	
LE032 ~039	3939173005	LT9213R (Red)	LED	
LE040, 041	3939356000	LT9233 (Green)	LED	
RESISTORS (not included Carbon Film ±5%, 1/4W Type)				
R304	2410193000	2.2k ohm ±5%	1/2W	Carbon Film
⚠ R315	2440033020	220 ohm ±5%	1W	Metal Oxide (NBF)
CAPACITORS				
⚠ C001	2538014003	0.01μF ±20%	400V(AC)	Ceramic
C101	2531024003	0.01μF +80,−20%	50V	Ceramic
C102~104	2531026001	0.047μF +80,−20%	50V	Ceramic
C105	2531024003	0.01μF +80,−20%	50V	Ceramic
C106,107	2544237036	47μF	16V	Electrolytic
C108	2544237007	10μF	16V	Electrolytic
C111	2544237036	47μF	16V	Electrolytic
C112	2544243017	1μF	50V	Electrolytic
C113	2544241006	4.7μF	35V	Electrolytic
C114	2544237007	10μF	16V	Electrolytic
C115	2544243033	3.3μF	50V	Electrolytic
C117	2531026001	0.047μF +80,−20%	50V	Ceramic
C118	2533627000	100pF ±5%	50V	Ceramic
C119	2531024003	0.01μF +80,−20%	50V	Ceramic
C120	2531026001	0.047μF +80,−20%	50V	Ceramic
C201	2544237001	10μF	16V	Electrolytic
C202	2544237049	100μF	16V	Electrolytic
C203	2544243017	1μF	50V	Electrolytic
C204	2544243004	0.47μF	50V	Electrolytic
C205,206	2544243017	1μF	50V	Electrolytic
C207	2531026001	0.047μF +80,−20%	50V	Ceramic
C208	2533639001	330pF ±5%	50V	Ceramic
C209	2544237007	10μF	16V	Electrolytic
C210,211	2534350004	680pF ±5%	50V	Ceramic
C212	2544243033	3.3μF	50V	Electrolytic
C213	2531024003	0.01μF +80,−20%	50V	Ceramic
C214,215	2544243033	3.3μF	50V	Electrolytic
C216,217	2539031069	2700pF ±10%	25V	Ceramic
C218,219	2539035036	0.039μF ±10%	25V	Ceramic
C220,221	2539031056	1800pF ±10%	25V	Ceramic
C301	2544243004	0.47μF	50V	Electrolytic
C302,303	2533635005	220pF ±5%	50V	Ceramic
C311	2544239092	1000μF	25V	Electrolytic
C312	2544237007	10μF	16V	Electrolytic
C313	2544237049	100μF	16V	Electrolytic
C314 ~316	2544237007	10μF	16V	Electrolytic
C317	2531024003	0.01μF +80,−20%	50V	Ceramic
C321,322	2531024003	0.01μF +80,−20%	50V	Ceramic
C351	2590004006	22000μF		Backup Capacitor
C401	2531024003	0.01μF +80,−20%	50V	Ceramic
C402	2544235025	47μF	10V	Electrolytic
C403~406	2531024003	0.01μF +80,−20%	50V	Ceramic
C407	2544235038	100μF	10V	Electrolytic
C408	2531024003	0.01μF +80,−20%	50V	Ceramic
C409,410	2533618006	43pF ±5%	50V	Ceramic
C411,412	2531024003	0.01μF +80,−20%	50V	Ceramic
C413,414	2544243020	2.2μF	50V	Electrolytic
C415	2544243004	0.47μF	50V	Electrolytic
C416	2531024003	0.01μF +80,−20%	50V	Ceramic
C417,418	2544241006	4.7μF	35V	Electrolytic
C419	2531024003	0.01μF +80,−20%	50V	Ceramic
C421	2531024003	0.01μF +80,−20%	50V	Ceramic
C431	2544237049	100μF	16V	Electrolytic
C432	2543016009	1μF	50V	Electrolytic (By Pole)
C433	2531025002	0.022μF +80,−20%	50V	Ceramic
C434	2549011008	1μF	50V	Electrolytic (Low Leak)
C435	2531024003	0.01μF +80,−20%	50V	Ceramic
C441	2531026001	0.047μF +80,−20%	50V	Ceramic
C442	2533125007	15pF ±5%		Ceramic (Temp.)
C443	2554201049	390pF ±5%	50V	Plastic Film
C501	2531024003	0.01μF +80,−20%	50V	Ceramic
C502~504	2539030028	2200pF ±10%	25V	Ceramic
C601	2544243033	3.3μF ±20%	50V	Electrolytic
C602	2544243004	0.47μF ±20%	50V	Electrolytic
C603	2544237052	220μF ±20%	16V	Electrolytic
TC001	2130022008	Trimmer Condenser		1
COIL, TRANS				
L201,202	2350032014	Inductor 39mH		2
T001	2312060008	FM IF Det. Trans	•	1
T003	2313028007	AM IFT	•	1
T004	2320106006	Anti Birdie Filter	•	1
T011	2311122002	MW Ant. Trans	•	1
T012	2311123001	MW OSC Coil	•	1
BT1	2310074009	Balun Trans	•	1
CF001, 002	2610064007	FM Ceramic Filter (SFT10.7MS2)		2
CF003	2610031001	AM Ceramic Filter (BFU450C4)		1
CF004	2610079005	Ceramic Filter (CSB456F11)	•	1
XL001	3990031005	X-tal (7.2MHz)		1
SWITCHES				
SW001	2129543006	1P Push Switch (Mode)		1
SW002	2124630008	1P Push Switch (MPX)	•	1
SW003	2124629006	1P Push Switch (Power)	•	
SW011, 012	2124407008	Tact Switch		2
SW014 ~025	2124407008	Tact Switch		12
E.U P				
⚠ PT001	2335565001	Power Trans	•	1
FL001	3934030004	7BT16ZA (FLD)	•	1
	2050350009	Antenna Terminal	•	1
	2160039003	Front End		1
	2048224008	2P Pin Jack		1
OTHER PARTS				
	2221396009	(P.W. Board)	•	1
	2090008146	Jumper Wire P=5mm		3
	2090008120	Jumper Wire P=10mm		66
	BP-5667H1	Terminal Pin		8
	1460858008	LED Holder	•	1
	1460857009	FLD Holder	•	1
CN301	2034362000	3P Connector Cord	•	1
CN702, 703	2042197005	7P Connector Cord	•	2
	2050190036	3P NH Connector Base		1
	2050190078	7P NH Connector Base		3
CN701	2042197018	7P Connector Cord	•	1

• indicates the parts newly used in this unit.

ETC0861 TUNER UNIT PARTS LIST for GERMANY (Same as ETC0861D TUNER UNIT P/LIST except the followings.)

Ref. No.	Part No.	Part Name & Descriptions	
RESISTOR			
R108	2412120000	15k ohm ±5% 1/4W Carbon Film	(Change)
CAPACITORS			
C302,303	2533635005	220pF ±5% 50V Carbon	(Delete)
COILS			
L601	2350016014	18μH Inductor	(Add.)

WIRING DIAGRAM

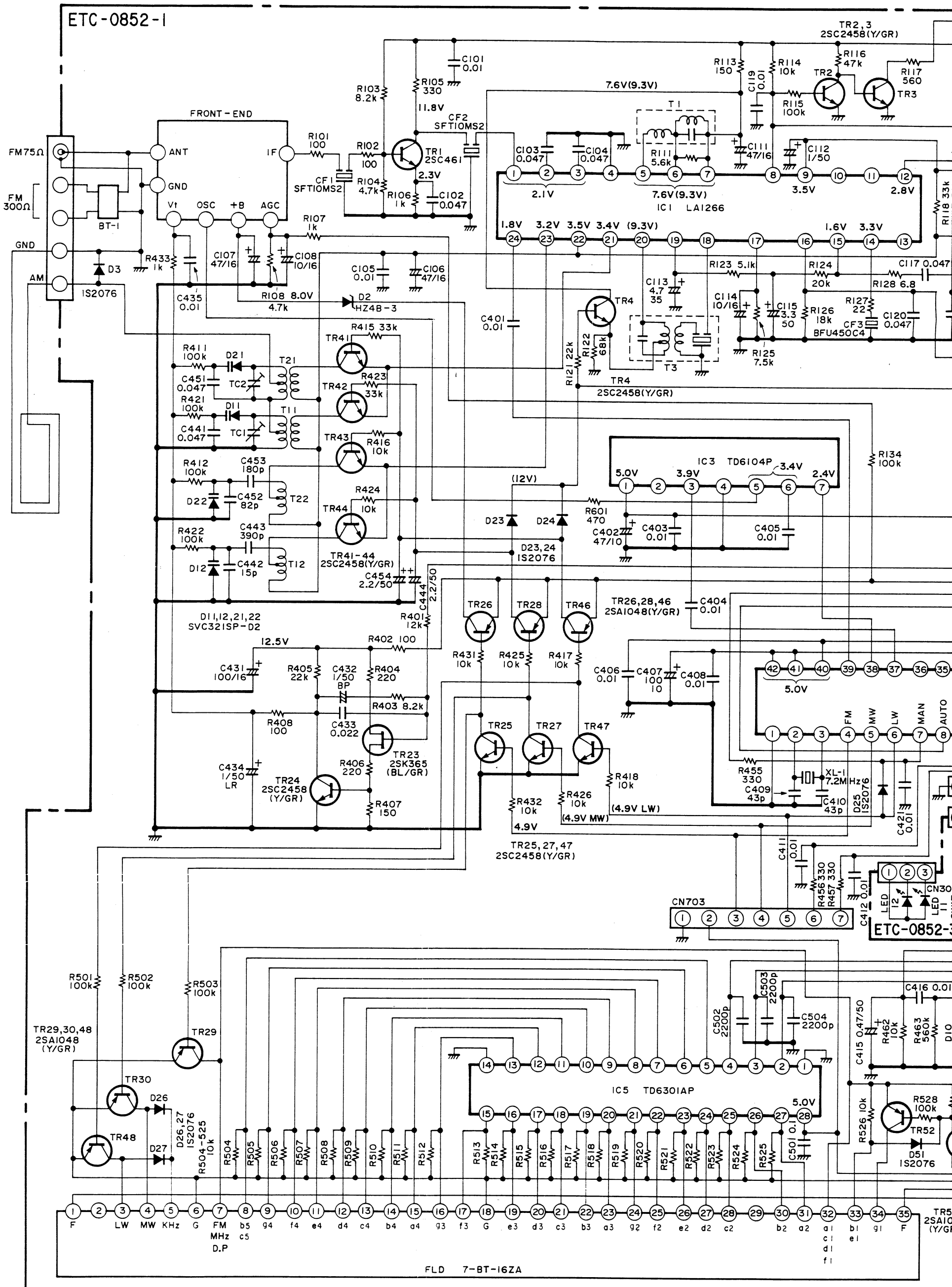


	Model Name	Unit No.
2 Band	Black for European	ETC0861D
2 Band	Black for Germany	ETC0861
2 Band	Gold for Germany	ETC0861
3 Band	Black for European	ETC0852B
3 Band	Black for U.K.	ETC0852
3 Band	Black for France	ETC0852

CAUTION – With the power switch in "Stand by" mode, mains is still connected.
WICHTIGER HINWEIS – Auch bei auf "Betriebsbereitschaft" gestelltem Netzschalter wird das Gerät noch mit Strom versorgt.
PRECAUTION – L'interrupteur d'alimentation sur "stand by" (attente), l'alimentation n'est pas coupée.
OBS! – Nätströmtillförseln kopplas inte ur när strömbrytaren står i beredskapsläget (Stand by).

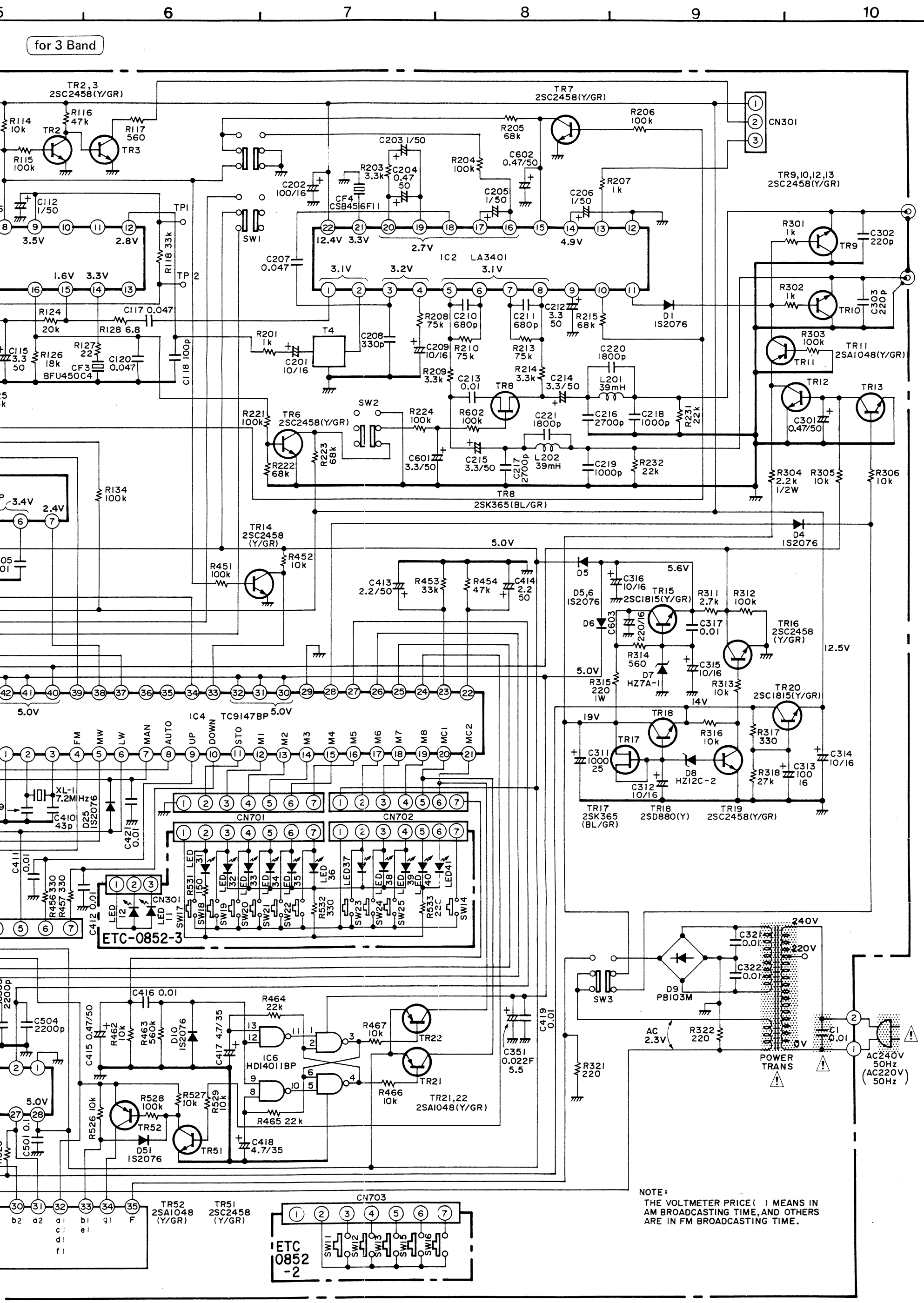
for 3 Band

ETC-0852-1



⚠ M
when nece
by the mar

for 3 Band

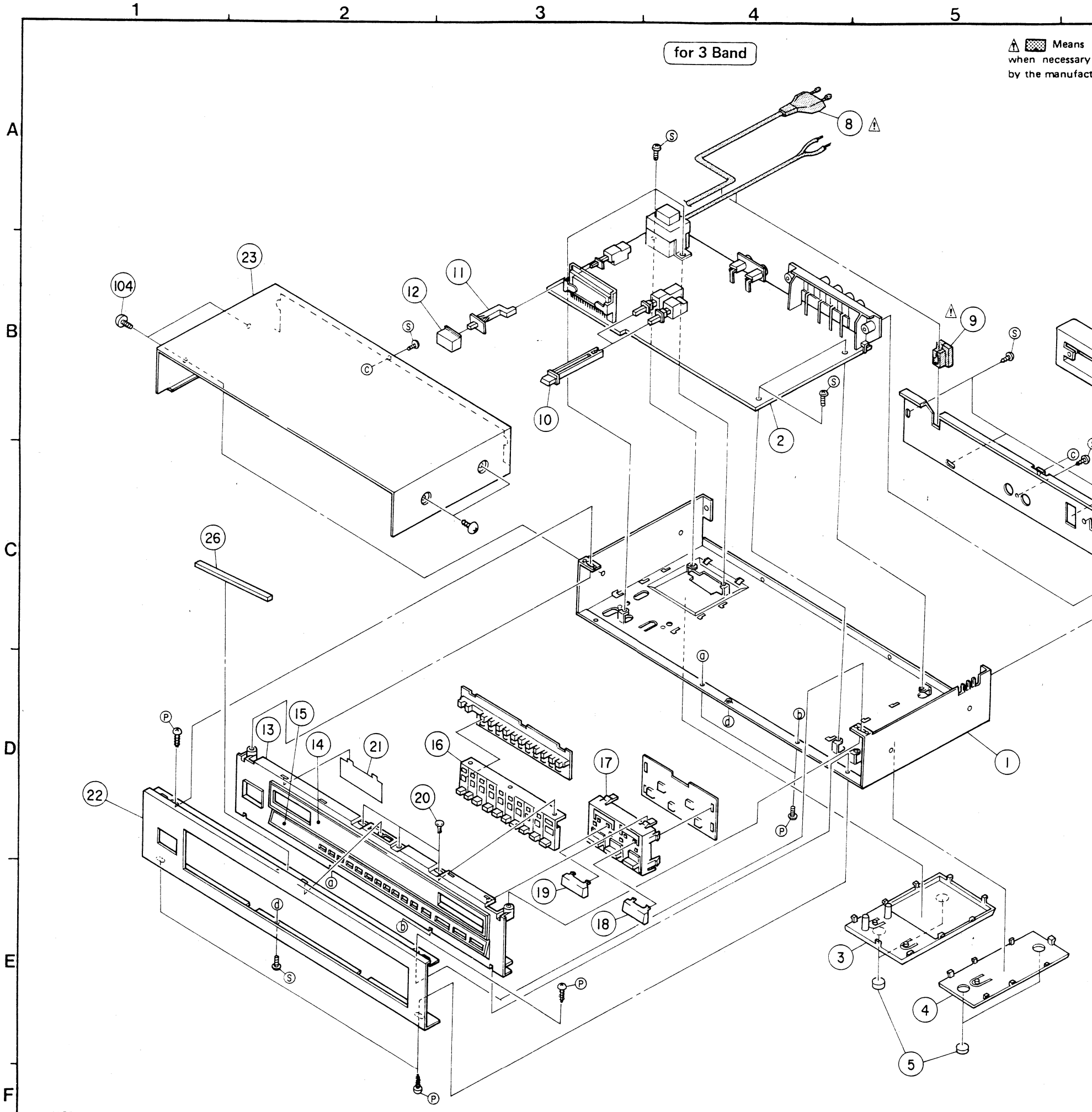


NOTE:
THE VOLTMETER PRICE( ) MEANS IN AM BROADCASTING TIME, AND OTHERS ARE IN FM BROADCASTING TIME.

⚠ ▨ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.

NOTES:
ALL RESISTANCE VALUES IN OHM, K = 1,000 OHM, M = 1,000,000 OHM.
ALL CAPACITANCE VALUES IN MICROFARAD, P = MICRO-MICRO FARAD.
EVERY VOLTAGES AND CURRENTS IS MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

EXPLODED VIEW OF CHASSIS AND CABINET



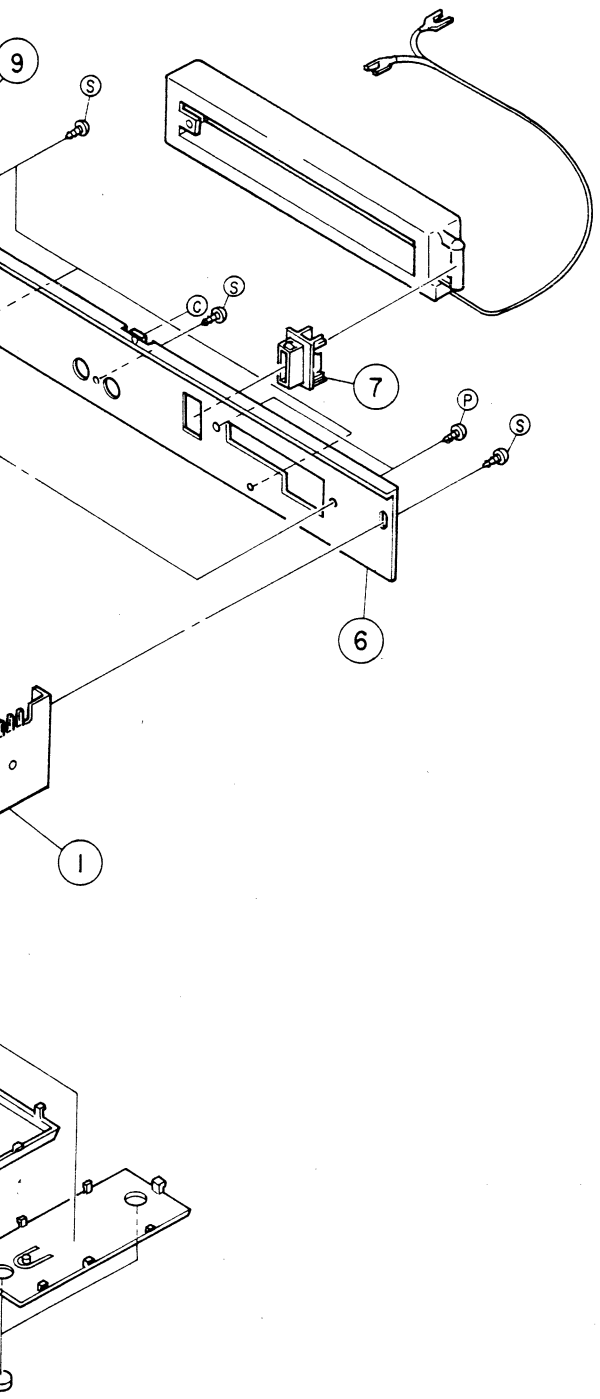
NOTE:
1. See addendum list right side for the parts with asterisk (*) on the Ref. No. and the other parts not included in the list.
2. ★ Mark not included EXPLODED VIEW.
3. The list is prepared based on E2 for Black Version.
4. • indicates the parts newly used in this unit.

EXPLODED VIEW OF CHASSIS AND CABINET

Ref. No.	Part No.	Part Name & Descriptions		Q'ty
1	4110595016	CHASSIS	•	1
*2	ETC0852B	TUNER UNIT	•	1s
3	1030948005	BOTTOM COVER (A)	•	1
4	1030949004	BOTTOM COVER (B)	•	1
5	4610162004	FELT PAD		4
*6	1050715001	BACK PANEL	•	1
7	1460859007	ANT. HOLDER	•	1
⚠ *8	2062047009	AC CORD		1
⚠ *9	4450056008	CORD BUSH		1
**10	1130866003	PUSH KNOB (C)	•	2
11	1190057001	KNOB JOINT	•	1
**12	1130854002	PUSH KNOB (P) (POWER)		1
**13	1460851005	INNER PANEL	•	1
**14	1430491000	WINDOW PLATE	•	1
*15	1430492009	ESC PLATE	•	1
**16	1130860009	PUSH KNOB (A)	•	1
**17	1130861008	PUSH KNOB (B) (TUNING)	•	1
**18	1130862007	KNOB CAP (D) (TUNING)	•	1
**19	1130862010	KNOB CAP (D) (TUNING)	•	1
20	4770096007	PUSH RIVET		3
21	1430493008	FILTER		1
**22	1441541004	FRONT PANEL	•	1
23	1020262005	TOP COVER	•	1
24	5138253009	APPROVAL MARK		1
★25	4450033005	WIRE CLAMP BAND		1
26				
27				

Ref. No.	Part No.	Part Name & Descriptions		Q'ty
SCREWS				
101	4737002021	TAPPING SCREW (S) 3x8 BLACK		12
102	4737508017	TAPPING SCREW (P) 3x10		8
103	—	—		
104	4734454038	TRUSS TAPPING SCREW (2) 4x8		4
105				
106				
PACKING & ACCESSORIES (not included EXPLODED VIEW)				
201	5050133003	CABINET COVER		1
202	5030576004	CUSHION	•	2
*203	5011141005	CARTON CASE	•	1
204	—	—		
205	PC-3244	ENVELOPE		1
206	2311126008	LOOP ANTENNA	•	1
207	2032101001	2P CONNECTOR CORD		1
208	5111476007	INST. MANUAL	•	1
*209	5139111014	COLOR LABEL (BLACK)		2
210	5131167008	CONTROL CARD		1
211				
212				

⚠ ▩ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



ADDENDUM LIST

Ref. No.	Part Name & Descriptions	Part No.			
		EK for U.K.	E2F for France		
2	TUNER UNIT	ETC0852	ETC0852		
6	BACK PANEL	1050693000	1050702001		
⚠ 8	AC CORD	2062051008	2062047009		
⚠ 9	CORD BUSH	4450056008	4450056008		
15	ESC. PLATE	1430492009	1430492009		
104	TAPPING SCREW (4x8)	4734454038	4734454038		
203	CARTON CASE	5011141005	5011141018		
209	COLOR LABEL	5139111014	5139111014		

For United Kingdom model only.

WARNING:

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

IMPORTANT

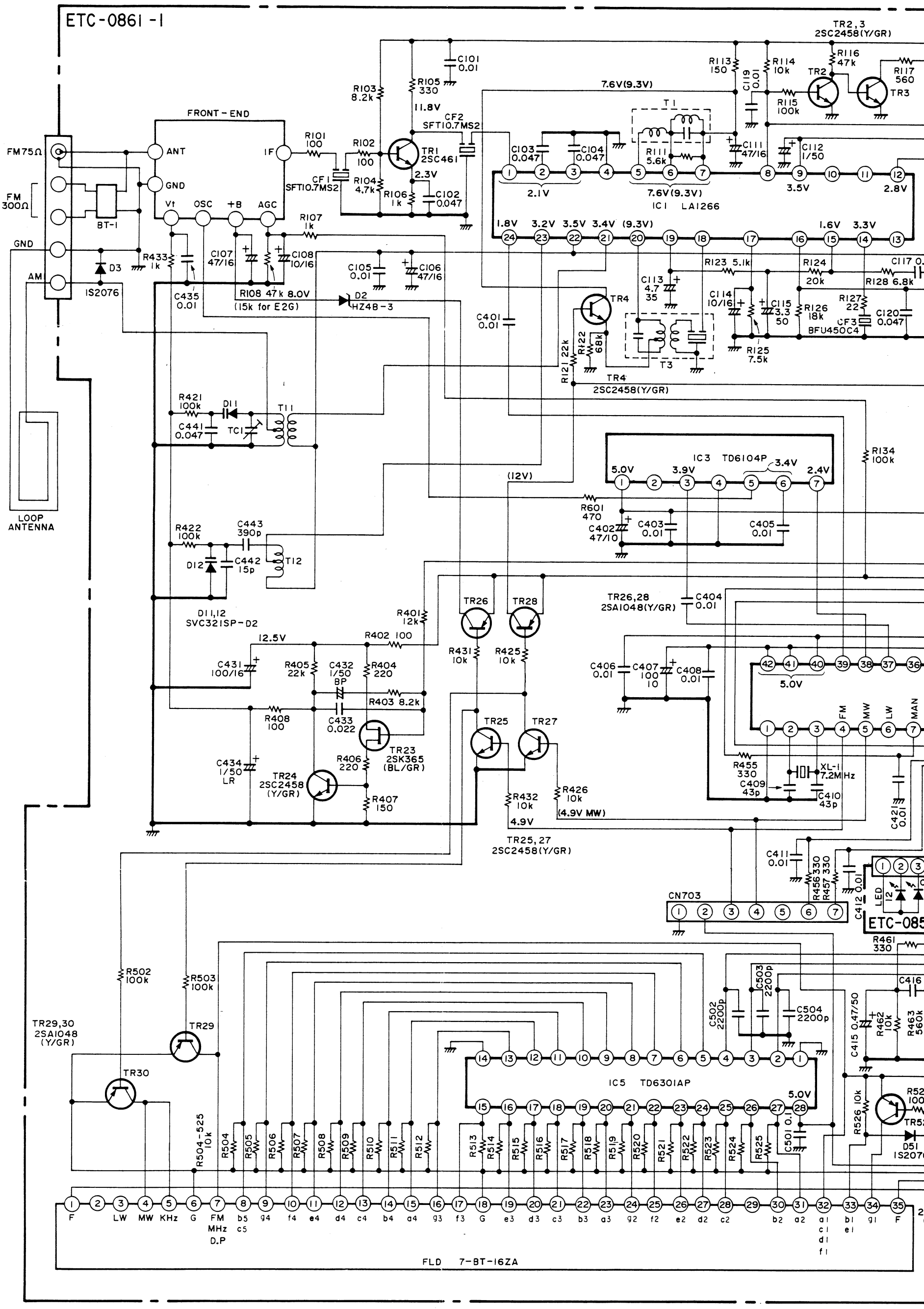
The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral
Brown: Live

SCHEMATIC DIAGRAM

for 2 Band

ETC-0861-1



for 2 Band

TR2,3 2SC2458(Y/GR)
R116 47k
R117 560
TR2
TR3
R114 0k
R115 100k
TR7 2SC2458(Y/GR)
R205 68k
R206 100k
CN301
C203 1/50
C202 100/16
CF4 CSB456F11
R203 3.3k
C204 0.47 50
R204 100k
C602 0.47/50
C205 1/50
C206 1/50
R207 1k
TR9,10,12,13 2SC2458(Y/GR)
Not used for E2G
R
L
E2G only
C112 1/50
TP1
TP2
R118 33k
SW1
12.4V 3.3V 2.7V 4.9V
IC2 LA3401
3.1V 3.2V 3.1V
C207 0.047
1.6V 3.3V
3.5V 2.8V
R124 20k
C117 0.047
R128 6.8k
R201 1k
T4
C208 330p
C201 10/16
R208 75k
C210 680p
C211 680p
C212 3.3 50
R215 68k
D1 IS2076
C209 10/16
R210 75k
R213 75k
C220 1800p
R209 3.3k
C213 0.01
R214 3.3k
C214 3.3/50
L201 39mH
TR8
C216 2700p
C218 1000p
R231 22k
R126 18k
R127 22
CF3 BFU450C4
C120 0.047
C118 100p
C115 3.3 50
R301 1k
TR9
C302 220p
L601 18μH
R302 1k
TRIO
C303 220p
R303 100k
TR11
TR11 2SA1048(Y/GR)
Not used for E2G
TR12
TR13
C301 0.47/50
R221 100k
TR6 2SC2458(Y/GR)
SW2
R224 100k
R602 100k
C221 1800p
R222 68k
R223 68k
C601 3.3/50
C215 3.3/50
C217 2700p
L202 39mH
C219 1000p
R232 22k
R304 2.2k 1/2W
R305 10k
R306 10k
TR8 2SK365(BL/GR)
R134 100k
3.4V 2.4V
TR14 2SC2458 (Y/GR)
R452 10k
R451 100k
5.0V
C413 2.2/50
R453 33k
R454 47k
C414 2.2 50
D4 IS2076
D5
5.6V
D5,6 IS2076
C316 10/16
TR15 2SC1815(Y/GR)
R311 2.7k
R312 100k
D6
C603 220/16
C317 0.01
TR16 2SC2458 (Y/GR)
12.5V
R314 560
D7 HZ7A-1
C315 10/16
R315 220 1W
R313 10k
TR20 2SC1815(Y/GR)
14V
19V
TR18
R316 10k
R317 330
TR17
C311 1000 25
C312 10/16
D8 HZ12C-2
C313 100 16
R318 27k
C314 10/16
TR17 2SK365 (BL/GR)
TR18 2SD880(Y)
TR19 2SC2458(Y/GR)
IC4 TC9147BP
FM MW LW MAN AUTO UP DOWN STO M1 M2 M3 M4 M5 M6 M7 M8 MC1 MC2
XL-1 7.2MHz
C410 43p
C421 0.01
CN701
CN702
LED 31 LED 32 LED 33 LED 34 LED 35 LED 36 LED37 LED 38 LED 39 LED 40 LED41
R531 150
R532 330
R533 220
SW17 SW18 SW19 SW20 SW21 SW22 SW23 SW24 SW25 SW14
CN301
LED 12 LED 11
R456 330
R457 330
C412 0.01
ETC-0852-3
R461 330
SW3
D9 PB103M
240V
220V
C321 0.01
C322 0.01
C1 0.01
AC 2.3V
R322 220
POWER TRANS
AC220V 50Hz
R321 220
C416 0.01
C504 2200p
C415 0.47/50
R462 10k
R463 560k
D10 IS2076
C417 4.7/35
R464 22k
R467 10k
TR22
TR21
R466 10k
TR21,22 2SA1048(Y/GR)
IC6 HDI4011BP
R465 22k
C418 4.7/35
C419 0.01
C351 0.022F 5.5
R528 100k
R527 10k
R529 10k
R526 10k
TR52
TR51
D51 IS2076
C501 0.1
CN703
SW11 SW12 SW15 SW16
ETC 0861 -2
TR52 2SA1048 (Y/GR)
TR51 2SC2458 (Y/GR)
b2 a2 a1 c1 d1 f1 b1 e1 g1 F

NOTE:
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⚠ ▨ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.

NOTES:
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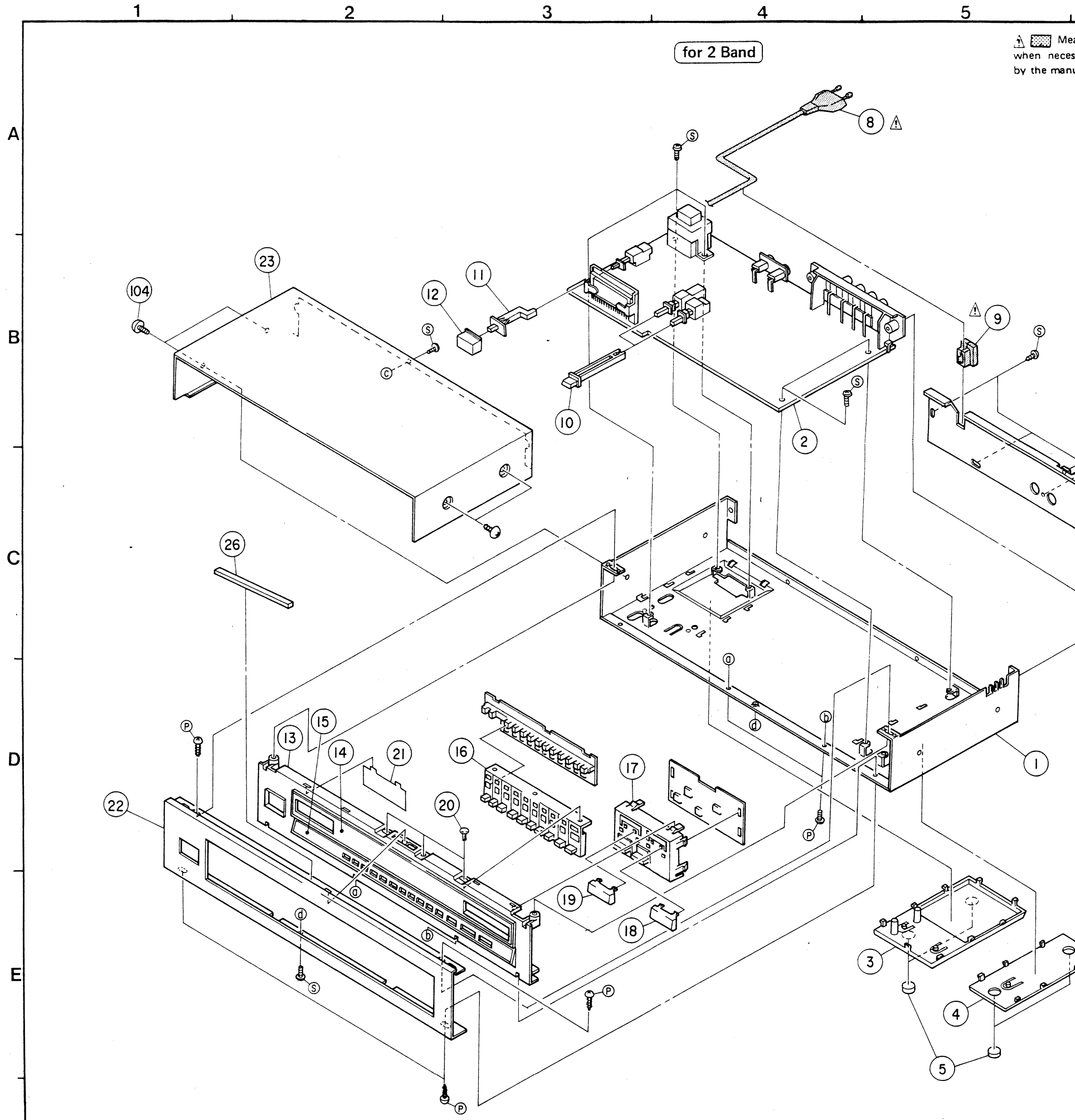
ALL CAPACITANCE VALUES IN MICROFARAD, P = MICRO-MICRO FARAD.
EVERY VOLTAGES AND CURRENTS IS MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

EXPLODED VIEW OF CHASSIS AND CABINET



NOTE:
1. See addendum list right side for the parts with asterisk (*) on the Ref. No. and the other parts not included in the list.
2. ★ Mark not included EXPLODED VIEW.
3. The list is prepared based on E2 for Black Version.
4. • indicates the parts newly used in this unit.

EXPLODED VIEW OF CHASSIS AND CABINET PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions		Q'ty
1	4110595016	CHASSIS		1
*2	ETC0861D	TUNER UNIT		1s
3	1030948005	BOTTOM COVER (A)		1
4	1030949004	BOTTOM COVER (B)		1
5	4610162004	FELT PAD		4
*6	1050693000	BACK PANEL		1
7	1460859007	ANT. HOLDER		1
⚠ *8	2062047009	AC CORD		1
⚠ *9	4450056008	CORD BUSH		1
**10	1130866003	PUSH KNOB (C)		2
11	1190057001	KNOB JOINT		1
**12	1130854002	PUSH KNOB (P) (POWER)		1
**13	1460851005	INNER PANEL	•	1
**14	1430491000	WINDOW PLATE		1
*15	1430492012	ESC PLATE		1
**16	1130860009	PUSH KNOB (A)		1
**17	1130861008	PUSH KNOB (B) (TUNING)		1
**18	1130862007	KNOB CAP (D) (TUNING)		1
**19	1130862010	KNOB CAP (D) (TUNING)		1
20	4770096007	PUSH RIVET		3
21	1430493008	FILTER		1
**22	1441541017	FRONT PANEL	•	1
23	1020262005	TOP COVER		1
24	5138253009	APPROVAL MARK		1
★25	4450033005	WIRE CLAMP BAND		1
26	4610319006	SPACER		1
27				
28				

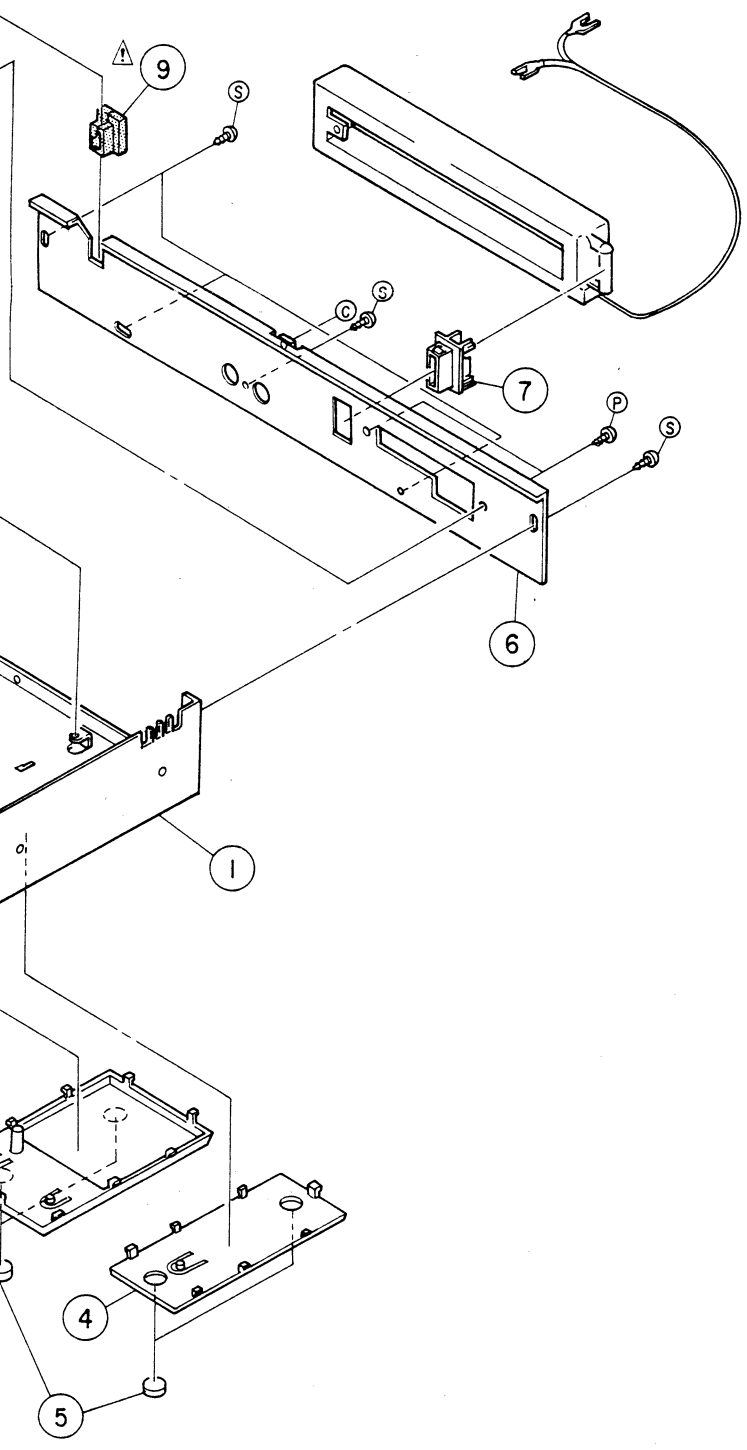
Ref. No.	Part No.	Part Name & Descriptions		Q'ty
SCREWS				
101	4737002021	TAPPING SCREW (S) 3x8 BLACK		12
102	4737508017	TAPPING SCREW (P) 3x10 BLACK		8
103	–	–		
*104	4734454038	TRUSS TAPPING SCREW (2) 4x8		4
105				
106				
PACKING & ACCESSORIES (not included EXPLODED VIEW)				
201	5050133003	CABINET COVER		1
202	5030576004	CUSHION		2
*203	5011141034	CARTON CASE	•	1
204	–	–		
205	PC-3244	ENVELOPE		1
206	2311126008	LOOP ANTENNA	•	1
207	2032101001	2P CONNECTOR CORD		1
208	5111476007	INST. MANUAL	•	1
*209	5139111014	COLOR LABEL (BLACK)		2
210	5131167008	CONTROL CARD		1
211				
212				

E2 Gold Version PARTS LIST
(Same as E2 BLACK VERSION except the followings.)

Ref. No.	Part No.	Part Na
12	1130854015	PUSH KNO
22	1441541020	FRONT PA
23	1020262018	TOP COVE
104	4734801005	TRUSS TA
203	5011141063	CARTON C
209	5139111001	COLOR LA

5 6 7

⚠ ▨ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



ADDENDUM LIST

Ref. No.	Part Name & Descriptions	Part No.			
		E2G for Germany			
2	TUNER UNIT	ETC0861			
6	BACK PANEL	1050703000			
⚠ 8	AC CORD	2062047009			
⚠ 9	CORD BUSH	4450056008			
15	ESC. PLATE	1430492012			
104	TAPPING SCREW (4x8)	4734454038			
203	CARTON CASE	5011141021			
209	COLOR LABEL	5139111014			

ld Version PARTS LIST
as E2 BLACK VERSION (Left P/List)
the followings.)

	Part No.	Part Name & Descriptions	Q'ty
	1130854015	PUSH KNOB (P)	1
	1441541020	FRONT PANEL	1
	1020262018	TOP COVER	1
	4734801005	TRUSS TAPPING SCREW 4x8	4
	5011141063	CARTON CASE	1
	5139111001	COLOR LABEL (GOLD)	2